Explanation of Figures.

1 to 7. These are sketches showing roughly the position and size of the tubercles. No attempt was made to find all the minute setae not arising from tubercles, except in Fig. 2. They represent a single segment, as if it had been unrolled and spread out, in each case showing the part extending up from the leg, just beyond the mid-dorsum. An arrow indicates the middle line. The annulets are indicated in some of them.

Fig. 1. Metathorax of *Pieris daplidice*, stage III.

" 2. A middle abdominal segment of the same. The primary setae are numbered, and the glandular ones indicated.

Fig. 3. Metathorax of *Pieris daplidice*, stage IV.

" 4. Middle abdominal segment of the same. Tubercles iv and v are no longer distinct.

Fig. 5. Metathorax of *Pieris brassicae*, stage II.

" 6. Middle abdominal segment of the same.

" 7. Middle abdominal segment of *Pieris brassicae*, stage III.

" 8. A tubercle, with base of the seta, from stage I of *Pieris daplidice*.

" 9. A tubercle of *Pieris brassicae*. In P. rapae it is quite the same.

THE CHALCIDOID PARASITES OF THE COCCID *EULECANIUM NIGROFASCIATUM* (PERGANDE), WITH DESCRIPTIONS OF THREE NEW NORTH AMERICAN SPECIES OF THE SUBFAMILIES ENCYRTINAE AND APHELININAE FROM ILLINOIS.

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The Terrapin Scale, *Eulecanium nigrofasciatum* (Pergande), since its recorded discovery in 1898 by Theodore Pergande, has become gradually more and more known in economic entomology, so that at present it is recognized as a pest of some importance. Although it has heretofore been known to be attacked by parasites, none of these have as yet been specifically recorded in the literature and therefore I

take pleasure in announcing the discovery in the State of Illinois of four encyrtine and aphelinine parasites new to this host and of the specific determination of one other, recorded by Gahan (1907) in Maryland. Three of these parasites proved to be new to science and are described in following. The other two are *Coccophagus lecanii* (Fitch) and *Coccophagus longifasciatus* Howard. The former is a common coccid parasite in the United States, attacking no less than eight or nine hosts; the latter was described in 1907 from Ceylonese specimens reared from (*Lecanium*) *Saissetia nigra* (Nietner) just ten years previously.

The parasites are described or listed in order of their systematic arrangement.

Family ENCYRTIDAE.

Subfamily Encyrtinae.

Tribe *Ectromini*.

1. *Anagyrus nubilipennis* species nova.

Normal position.

Female: — Length, 1.9 mm. Moderately large for the tribe.

General color shining black, with a metallic sheen; intermediate and posterior tarsi fuscous; anterior tarsi dusky; ventral aspect of scape fuscous. Wings normal, the oblique hairless line running from stigmal vein, proximo-ventrad to the posterior margin present and joined near that margin by another longer hairless line pointing distad, both together forming a broad "Y" marking whose mouth opens disto-cephalad into the wing; discal cilia moderately dense and uniform; marginal cilia short and close; an infuscation, rectangular in shape, extends transversely across the wing from the stigmal, marginal, and distal fourth of the submarginal veins to the posterior margin and includes most of the two hairless lines; the distal (or lateral) margin of this infuscation is somewhat convex; remainder of the wing hyaline; venation dusky or brownish black; marginal vein short and broad, darker, slightly longer and broader than the postmarginal vein but equal to the stigmal vein in length. Hind wings hyaline, discal cilia close, with a short curved hairless line at basal third, originating at the postmarginal vein.

Antennae clavate, the funicle cylindrical, inserted near the clypeal border. Scape long and slender, nearly reaching the vertex, nearly as long as the pedicel and first two funicle joints combined, very slightly compressed or dilated distad; pedicel obconic, over one-third shorter than funicle joint 1, the latter cylindrical and slightly longer than the next joint; funicle joint 2 broader; funicle joint 3 subequal to

funicle 2; funicle joints 4–6 subequal, gradually widening, subglobose; club 3-jointed, conical. Antennae 11-jointed, moderately pubescent. Scrobes oval.

Face with a metallic green lustre, sheened, beneath the eyes laterad of the scrobes with a number of large scattered punctures. Eyes dark garnet, prominent; ocelli rather large, in a triangle, the lateral ones near the eye margin; vertex also bearing moderately large scattered punctures. Thorax delicately sheened, with similar punctures; the mesoscutum bearing rather coarse setae, which are short however. Pleura delicately longitudinally rugulose. Abdomen with delicate polygonal sculpture. Tegulae prominent, concolorous. Ovipositor inconspicuous. Mesothorax and scutellum robust, the latter similarly sculptured. Axillae not quite approximate or confluent.

Male: — Length, 1.3 mm. The same, smaller. Antennae paler, dusky, subplumose or feathery. Anterior and intermediate tarsi pallid; posterior tarsi white, including tips of tibia; the infuscation of the wings absent. Antennae 9-jointed, filiform, their funicle joints long and slender and constricted at the middle, inserted in the middle of the face. Scape short and slightly dilated, darker, thrice the length of the pedicel, the latter short, conical; funicle joints 1–6 subequal, cylindrical, uneven, and over twice the length of the pedicel; all, including the club, bearing sparse, long, soft setae, and they are somewhat narrowed and lengthened distad; club single, similar to the funicle joints, but one-third longer, and tapering distad. Mandibles bidentate, one tooth broad and nearly truncate, but with a slight emargination at the centre of the apical margin; the other tooth obtuse and narrower. Genitalia long. (⅔-inch objective, 1-inch optic, Bausch and Lomb.)

Described from 23 ♂'s, and 1 ♀ reared June 9th, 10th, 15th and 20th, 1908, from overwintered females of *Eulecanium nigrofasciatum* (Pergande) on peach, in the insectary of the office of the State Entomologist of Illinois.

Habitat: — Carbondale, Illinois (L. M. Smith).

Types: — Accession *Nos. 37537, 37546* and *37550*, Illinois State Laboratory of Natural History, Urbana, Illinois, 5 ♂'s, 1 ♀, tagmounted.

Cotype: — *No. 12011*, U. S. National Museum, Washington, D. C., 4 males, tagmounted.

Tribe *Mirini*.

2. *Aphycus stomachosus* species nova.

Normal position.

Female: — Length, 1.25 mm. Moderate to small for the tribe.

General color, dark lemon yellow, with a tinge of greenish, the dorsum of the

whole of the mesothorax slightly darker, deep pale cadmium yellow, the dorsum of the metathorax, cephalic aspect of pronotum and dorsum of abdomen slightly dusky, legs (including coxae) paler, excepting the dusky apical tarsal joint of the cephalic legs and the extreme tips of the others; mandibles fuscous apically, the intermediate tooth slightly the largest; ventum concolorous with body, paler; scape and pedicel and the 2 apical funicle joints concolorous, the scape with some dusky above at distal end, the funicle dusky yellow, the basal club joint black; venation pallid yellow; wings hyaline, the discal cilia dense; postmarginal vein absent; incisions of abdominal segments, dorsad, pale. At the caudo-lateral margin of the pronotum in the dorso-lateral aspect, on each side, is a single small black dot. Eyes yellowish green with scattered minute hairs; ocelli in an acute-angled triangle, ruby red, each with a yellowish area; the distance between the lateral ocelli and the eye margin is much less than that between them and the cephalic ocellus; the lateral ocelli are much further from the occipital, than from the eye margin.

Vertex, pro-, and mesonotum delicately, hexagonally sculptured, the setae arising from moderately large scattered punctures; the cheeks and face delicately rugose, with punctures like that of the mesothorax; the sculpture of the vertex, pronotum, and mesonotum sub-alutaceous; axillae transversely triangular, meeting at the meson; scutellum peltate; mesopleura delicately, polygonally sculptured, in balsam mounted specimens distinctly longitudinally striate.

Hypopygium projecting slightly beyond the abdomen; basal club joint deep black.

Antennae eleven-jointed, the club being distinctly three-segmented. Scape, pedicel, and two apical funicle joints concolorous, the penultimate distal funicle joint, however, with some dusky, and the distal two club joints somewhat pallid. Scape slightly dilated as in the male, at the center of one margin; pedicel and funicle the same; funicle joints 1–4 subequal, globose or subglobose, funicle 1 slightly longer than joints 2 and 3, and funicle 4 slightly longer than funicle 1, and more transverse; funicle joints 5 and 6 much wider, 6 nearly one-third longer and wider than the preceding joint. Club joints unequal, 1 longest and deep black, 2 nearly one-half shorter than 1 and the distal joint conical and smaller; distal 2 club joints dusky.

(From many specimens, $\frac{2}{3}$-inch objective, 1-inch optic, Bausch and Lomb).

Male: — Length, 0.90 mm. The same, more slender and smaller. Genitalia not exserted.

Antennae 9-jointed, the club very indistinctly triparted by transverse sutures, visible under high power; scape but slightly dilated; pedicel as long as the next two joints combined; funicle moniliform, joints 1 and 2 subequal, smallest, 2 slightly

larger; 3 one-quarter larger; 4 and 5 subequal, one-third larger than 3; 6 largest, nearly twice the size of 4 and 5; uncle joints gradually enlarging to club; the latter cylindrical oval, much longer than the two preceding joints. Antennae pilose.

An oblique (proximo-caudad) hairless line on fore wings somewhat irregular, but narrow, widening gradually caudad at the posterior margin (normal position).

(From many specimens, ⅔-inch objective, 1-inch optic, Bausch and Lomb.)

Small, exceedingly active creatures resembling in general the *Aphelininae* and nearest to *Aphycus cockerelli* Howard and *annulipes* Ashmead. The position of the ocelli, coloration of the antennae, hyaline wings with the oblique hairless line and immaculate legs, are characters distinct from any of the described species. Reared from overwintered females of *Eulecanium nigrofasciatum* (Pergande) on peach twigs, June 20th, 22nd, 23d, 30th, 1908.

Habitat: — Carbondale, Illinois (L. M. Smith).

Types: — Accession *Nos. 37551, 37552* and *37559* (10 ♂'s, 3 ♀'s in balsam) and *No. 37580* (many ♂'s & ♀'s, tagmounted and in balsam), Illinois State Laboratory of Natural History, Urbana, Illinois.

Cotype: — *No. 11997*, U. S. National Museum, Washington, D. C., 3 ♀'s, 1 ♂, tagmounted.

Family EULOPHIDAE.

Subfamily Aphelininae.

Tribe *Aphelinini*.

3. *Coccophagus cingulicentris* species nova.

Normal position.

Female: — Moderate in size.

General color piceous black, shining: eyes and ocelli bright red, the former coarse, and bearing moderately thick whitish pubescence; legs pallid yellow, antennae the same but darker; the base of the abdomen with a broad belt of yellowish white, covering more than a third of the length of the abdomen, and very conspicuous; tip of abdomen pallid. Entire mesothorax moderately coarsely polygonally sculptured, nearly as coarse as the surface of the eyes, the sculpture however not uniform; metathorax apparently smooth, or slightly transversely rugulose. Base of the mesopostscutellum pallid; vertex and head rugose. Ventum, except basal third of abdomen, piceous. Coxae pallid. Abdomen smooth, shining. Ovipositor not exserted. Tegulae dark.

Wings hyaline, but slightly infuscated beneath the stigmal vein, the infuscation

extending across the wing and irregular in shape. Venation dusky; wing uniformly densely ciliate. Hairs of thorax dark, those of the abdomen lighter. Hind wings with discal cilia uniform.

Scape of antennae slender, much longer than the 2 following joints combined; pedicel shorter than funicle 1, subcuneate; funicle joint 1 cylindrical, shorter than the next joint; funicle joints 2 and 3 subequal, one-fourth longer than funicle 1, and slightly broader; club rather closely united, the basal and intermediate joints about subequal, the last joint conical, slightly, shorter; club not as long as the funicle. Antennae moderately, uniformly hairy, and with the usual longitudinal carinae. ($\frac{2}{3}$-inch objective, 1-inch optic, Bausch and Lomb.)

Male: — Unknown.

Described from two female specimens reared from overwintered females of *Eulecanium nigrofasciatum* (Pergande), June 7th, 1908, in the insectary of the office of the State Entomologist of Illinois. The host was on peach collected by Mr. L. M. Smith of the State Entomologist's office, at Carbondale, Illinois, June 4th, 1908.

From the naked eye black, with a white band around abdomen.

Type: — Accession *No. 37536*, Illinois State Laboratory of Natural History, Urbana, Illinois. One female mounted in balsam.

Different from all other described species in the genus in having the broad transverse whitish belt about the base of the abdomen and the infuscated forewings. The black color, the concolorous scutellum, the broad white band of the abdomen, the polygonal sculpture of the thorax, the infuscated wings, and pallid coxae are characteristics of the species.

4. *Coccophagus longifasciatus* Howard.

Howard, 1907, pp. 80–81, fig. 17.

This striking species was described just recently by Howard (1907) from specimens reared from (*Lecanium*) *Saissetia nigra* (Nietner) in 1897 at Manaar, Ceylon. It was the first parasite reared from *nigrofasciatum* in Illinois, having emerged while the hosts were in transit from Carbondale to Urbana (June 15th, 1908). Subsequently, it was reared in large numbers from the same hosts June 7th to 20th, 1908, and again, abundantly, from the host on peach sent from Cobden, Illinois, by Mr. L. M. Smith, on July 14th to 19th, 1908. From the large number of specimens reared, the specific determinations of which have been most kindly confirmed by Dr. L. O. Howard, I draw up the following additional descriptive details:

Female: Scape of antennae as long as, or longer than, the united lengths of the next three joints; pedicel subconic, longer and broader than the first joint of the

funicle, which is cylindrical oval; joint 2 of the funicle nearly twice the length of the proximal funicle joint, cylindrical, wider than the proximal funicle joint; joint 3 of the funicle a third shorter and broader than funicle joint 2, subequal to the pedicel; club slightly shorter than the funicle, more compact and somewhat broader, its component joints subequal, the intermediate joint slightly the shortest, subequal to funicle joint 3, the terminal joint conical, subequal in length to the proximal joint of the club, but somewhat narrower. Setae of funicle longest.

Wings hyaline, both pairs uniformly ciliate in the disk, the hind wings less densely so. Proximal tarsal joint longest in the caudal legs a half again longer than the tibial spur, but not longer than the following three tarsal joints. The middle tibial spur a third longer than the proximal joint of the intermediate legs.

Male: Pedicel of antennae small, subtriangular, very much smaller than the first funicle joint; joints 1 to 3 of the funicle subequal, gradually, slightly enlarging cephalad, each at least thrice the size of the pedicel, their attachments lateral, the cephalic margin of the opposite halves of their apices conspicuously concaved, so that the opposite lateral angle is acute (not visible in some aspects); funicle joint 4 longest and broadest, its attachment central, a third longer than the proximal funicle joint and a fourth longer than the third funicle joint; joint 5 of the funicle distinctly narrower and shorter than joint 4, subequal in length to joint 3 but narrower; the club joint conic, much narrower, and subequal in length to funicle joints 3 and 5. Longitudinal carinae prominent.

Longitudinal fasciation of the body not distinct as in the female, and therefore this sex is not very much like the female.

The species has not been mentioned in the literature other than as recorded in foregoing.

5. *Coccophagus lecanii* (Fitch).

This species was first described from New York State by Asa Fitch (1859) who placed it in the genus *Platygaster* Latreille. Just twenty years afterwards, Miss Emily A. Smith (1878a) redescribed it as new under the name *Coccophagus lecanii* from specimens reared in Illinois; and three years later, Howard (1881) again described it as new to science under the name *Coccophagus ater*; in the same publication, Howard established the identity of *Platygaster lecanii* (Fitch) and *Coccophagus lecanii* E. A. Smith, placing the species in the proper family and genus. Again, Howard (1895) established the identity of his species *ater* with *lecanii* (Fitch), and in addition expressed the opinion that *lecanii* (Fitch) may possibly be synonymic with the European *Coccophagus scutellaris* (Dalman), but that the existing descriptions

precluded conclusions in regard to that opinion. Previously, Putnam (1879, p. 332, footnote) had said: "I am very much inclined to think that *Platygaster lecanii* described by Fitch in his 5th New York Report, as infesting *Lecanium quercitronis* may prove to be really a *Coccophagus* nearly allied if not identical with this species. The description applies too well to easily believe that the two species belong to different families. In this event Dr. Fitch's reference to the *Proctotrupidae* is of course wrong."

In 1898, de Dalla Torre held Miss Smith responsible for the species, entirely overlooking the original description of Fitch's.[1] In view of the foregoing, the following is the synonymy of the species:

Platygaster lecanii Fitch (1859).
Coccophagus lecanii E. A. Smith (1878*a*).
Coccophagus ater Howard (1881).
Coccophagus lecanii Smith (de Dalla Torre, 1898).
Platygaster lecanii Thomas, *nec* Thomson (de Dalla Torre, 1898, p. 474).

The following hosts of the species are now known, listed chronologically:

1.	*Eulecanium quercitronis* (Fitch).	Fitch, 1859.
2.	*Pulvinaria innumerabilis* (Rathvon).	E. A. Smith, 1878*a*.
3.	*Pulvinaria acericola* (Walsh and Riley).	E. A. Smith, 1878*b*.
4.	*Coccus hesperidum* Linnaeus.	Howard, 1881.
5.	*Eulecanium persicae* (Fabricius).	Howard, 1895.
6.	*Phenacoccus aceris* (Signoret).	Howard, 1895.
7.	*Eulecanium pruinosum* (Coquillett).	Howard, 1895.
8.	*Coccus ventralis* Ehrhorn.	Carnes, 1907.
9.	*Eulecanium nigrofasciatum* (Pergande).	A. B. Gahan, *in litt.* June 25, 1908).

In addition to these nine specific records of hosts, it is recorded to have been reared from "*Lecanium*" on plum (Howard, Webster, 1895) and "*Lecanium*" on maple (Howard, 1881). De Dalla Torre (1898) gives additionally (to the first seven hosts listed) *Lecanium acericorticis* which is a synonym of *Pulvinaria innumerabilis* (Rathvon), but he omits mention of *Pulvinaria acericola* (Walsh and Riley). In regard to the latter, it seems strange that Miss E. A. Smith (1878 *a, b*) writing of the same parasite from the same locality at the same time, should record different specific hosts of the same genus; it is supposed by some to be synonymic with *innumerabilis*.

[1] De Dalla Torre (1898, p. 474) also lists it as *Platygaster lecanii* Thoms. (*sic*) which therefore is a synonym of *C. lecanii* (Fitch). Smith (1881 *b*) mentioned and quoted Fitch's description, stated that it applied to her species but that the latter was chalcidoid not proctotrypoid and hence new. De Dalla Torre credited the article to the wrong author.

The species of *Coccophagus* mentioned by J. G. Sanders (1907) in writing of *Eulecanium nigrofasciatum* (Pergande) is most probably this parasite and the "chalcid fly" recorded by A. B. Gahan (1907) from this same host in Maryland was later determined as *lecanii* (A. B. Gahan, *in litt.*, June 25th, 1908), making the first specific record of this host, here published for the first time. I did not meet with it in connection with the host under consideration in Illinois, but during 1908 reared it from young *Pulvinaria innumerabilis* (Rathvon) at Urbana, July 26th.

This coccid parasite is widely distributed in the United States having been reared in the following states — New York, Illinois, Iowa, District of Columbia, Maryland, Massachusetts, California, New Jersey, Colorado and Ohio. Of these, Maryland is a new locality. It has also been collected at St. Vincent, Windward Islands, West Indies (Howard, Riley, 1896) and has just been recorded from Ontario, Canada.

What is known of the biology of this species is recorded in Putnam (1879) and Howard (1881, 1895, 1900). A bibliography of the species is appended.

Bibliography of *Coccophagus lecanii* (Fitch).

1859. Fitch, Asa. Fifth report on the noxious and other insects of the State of New York. Made to the *etc.* Albany, pp. 25–26.

Original description as *Platygaster lecanii*; host "*Lecanium quercitronis.*"

1878*a*. Smith, Emily A. American naturalist, Philadelphia, XII, p. 661, footnote; fig. 6, a–b.

Redescription as new under the name *Coccophagus lecanii*; host, female "*Lecanium acericorticis.*" Figure of female and pupa.

b. Idem. The Maple-tree Bark-louse — *Lecanium acericola* Walsh and Riley. Seventh report of the State entomologist on the noxious and beneficial insects of the State of Illinois. (2nd annual report of Cyrus Thomas). Springfield, pp. 129–130, fig. 31, a–b.

Description of a parasite of the forementioned coccid, quoting Fitch's (1859) description and stating:

"This description answers as far as it goes for the parasite bred on the *acericola*, but instead of it belonging to the Proctotrupidae family, it belongs to the Chalcididae. I therefore record it as a new species."

Brief description; no name really given here. Cf. de Dalla Torre (1898, p. 474).

1879. Putnam, J. Duncan. Proceedings Davenport (Iowa) Academy Natural Sciences, II, pp. 297, 332–333 and foot-note to p. 332.

Brief descriptions of the stages; apparent number of broods; method of emergence of the adult; parasitized hosts. *Coccophagus lecanii* Smith. Calls attention to its probable identity with Fitch's (1859) species.

1881. Howard, Leland Ossian. *In* John Henry Comstock, Report of the Ent. *in* Annual Rep. (U. S.) Commissioner of Agric. f. year 1880, Washington, D. C., pp. 357–358.

Brief description of both sexes; lists three hosts, Nos. 1, 2 and 4 of the foregoing list; synonymic with *C. lecanii* Smith (1878). Brief biological notes.

Idem. Ibid., pp. 359–360.

Redescription as new under the name of *Coccophagus ater* from "*Lecanium*" species on maple, Ithaca, N. Y.

1885. Idem. Bull. No. 5, *Bureau* Ent., U. S. Dep. Agric., Washington, D. C., p. 43.

C. lecanii Fitch and *ater* Howard listed separately.

1887. Cresson, Ezra Townsend. Catalogue described Hymenoptera of America north of Mexico, *in* Synopsis Hymenoptera of America, North of Mexico. Transactions American entomological society, Philadelphia, supplementary volume, 1887, p. 240.

Same as Howard (1885).

1894. Craw, Alexander. Fourth biennial report state board of horticulture of State of California f. 1893–94, Sacramento, Rep. f. 1893, p. 97.

A parasite of *Coccus hesperidum* Linnaeus in California.

1895. Howard, Leland Ossian. Bull. No. 1, technical series, Division Ent., U. S. Dep. Agric., Washington, D. C., pp. 10, 11–12, 13–14, 32, 33–34.

C. lecanii (Fitch) may prove a synonym of *C. scutellaris* (Dalman); host relations; synonymy and brief description, with list of 7 hosts.

Webster, Francis Marion. Bull. No. 2, new series, Division Ent., U. S. Dep. Agric., Washington, D. C., p. 90.

Reared from "plum scale" in Ohio.

1896. Howard, Leland Ossian. Journal Linnean Society, London, Zoology, XXV, p. 97.

Recorded from St. Vincent, West Indies; synonymy and the 3 hosts previously given (Howard, 1881).

Riley, Charles Valentine. Ibid., p. 60.

Listed from St. Vincent, Windward Islands, West Indies.

1898. de Dalla Torre, Carl G. Catalogus hymenopterorum hucusque descriptorum systematicus et synonymicus, Lipsiae, V, p. 225 and footnote.

Coccophagus lecanii Smith; synonymy. In the footnote, list of hosts as in Howard (1895), excepting substitutes "*Lecanium acericortieis*" for "*Lecanium* on plum."

Felt, Ephraim Porter. Extract from 4th Annual Rep. Commissioners Fisheries, Game and Forestry of State of New York, p. 30. On *Pulvinaria innumerabilis* (Rathvon).

1900. Ashmead, William Harris. *In* John Bernhard Smith, Insects of New Jersey. Supplement, 27th annual Rep. state board Agric., 1899, Trenton, p. 560.

C. lecanii (Fitch) and *ater* Howard listed separately.

Howard, Leland Ossian. Bull. no. 22, new series, Division Ent., U. S. Dep. Agric., Washington, D. C., pp. 13–15.

Very abundant on *Pulvinaria innumerabilis* in Washington City; 99% of the young killed; general biological notes.

1901. Ehrhorn, E. M. California Fruitgrower, Dec. 12, pp. 3–4. (Not seen.)

1902. Craw, Alexander. Eighth biennial report state board of horticulture of the State of California f. 1901–1902, Sacramento, pp. 192–193, 203.

Colonization in California; on *Coccus hesperidum* Linnaeus.

1903. Wall, W. B. California Fruit Grower, San Francisco and Los Angeles, XXVIII, p. 4 (June 13).

An efficient parasite of *Coccus hesperidum* Linnaeus.

1905. Isaac, John. Bug vs. Bug. First biennial report commissioner of horticulture State of California f. 1903–1904, Sacramento, pp. 80, 102, pl. II, figs. 2, 2a.

On *Coccus hesperidum*. Colored, general figure of adult female, enlarged.

Sanders, James G. Circular No. 64, Bureau Ent., U. S. Dep. Agric., Washington, D. C., p. 4.

On *Pulvinaria innumerabilis* (Rathvon).

1906. Dickerson, E. L. *In* John Bernhard Smith, Report of the Ent. Dept. of the New Jersey Agric. College Exp. Station, Trenton, pp. 594–595, 596, 598, 607, fig. 35, p. 602.

Notes on its occurrence in New Jersey as a parasite of *Pulvinaria innumerabilis* (Rathvon); figure of adult, enlarged.

Johnson, S. Arthur. Bull. No. 116, Colorado Agric. College Exp. Station, Fort Collins, p. 11.

Brief account of as a parasite of *Pulvinaria innumerabilis* (Rathvon).

1907. Carnes, Edward K. The Coccidae of California. Second biennial report commissioner horticulture State of California f. 1905–1906, Sacramento, pp. 179, 187.

On *Pulvinaria innumerabilis* and *Coccus ventralis* Ehrhorn in California.

Forbes, Stephen Alfred. Bull. No. 112, University of Illinois Agric. Exp. Station, Urbana, p. 357, fig. 6.

On *Pulvinaria innumerabilis* (Rathvon); figure from J. B. Smith (Dickerson, 1906).

Gahan, A. B. Bull. No. 123, Maryland Agric. Exp. Station, College Park, pp. 155–156.

Mentions a chalcidoid parasite of *Eulecanium nigrofasciatum* which is later determined as *lecanii* (Fitch).

Howard, Leland Ossian. Bull. No. 12, Part IV, technical series, Bureau Ent., U. S. Dep. Agric., Washington, D. C., p. 71.

Probably a species native to North America.

Sanders, James G. The Terrapin Scale. Circular No. 88, Bureau Ent., U. S. Dep. Agric., Washington, D. C., p. 3.

1908. Cook, A. J. Official report 34th fruit-growers convention of State of California, Sacramento, p. 52.

Mentioned as a parasite of *Coccus hesperidum* Linnaeus.

Forbes, Stephen Alfred. Twenty-fourth report State Ent. on the noxious and beneficial insects of State of Illinois, Bloomington, p. 114, fig. 6.

The same as Forbes (1907).

1909. Eastham, J. W. Thirty-ninth Annual Rep. Ent. society of Ontario, 1908, Toronto, p. 55.

A parasite of *Pulvinaria innumerabilis*.

Literature referred to.

1907. Gahan, A. B.

Howard, L. O. See in foregoing bibliography.